The Orbit of OΣ 269. By J. E. Gore.

A measure made by Mr. Burnham last year, of this close and difficult double star, discovered by O. Struve in 1844, shows that one revolution had then been nearly completed. I have computed the orbit and find the following provisional elements :—

Elements of OΣ 269.

$P = 47{\cdot}70$ years.	$\Omega = 51^\circ\ 56'$
$T = 1883{\cdot}12$	$\lambda = 43^\circ\ 30'{\cdot}5$
$e = 0{\cdot}0575$	$\mu = +7^\circ{\cdot}547$
$i = 82^\circ\ 48'{\cdot}7$	$a = 0''{\cdot}58$

These elements are remarkable for the high inclination and small eccentricity of the real orbit, an eccentricity very unusual in binary stars. The apparent ellipse I find very much resembles that given by Mr. Burnham in the *Observatory* for 1891 July, but is more elongated.

The following is a comparison between the above elements and the measures used in computing the orbit :—

Epoch.	Observer.	θ_o	θ_c	$\theta_o - \theta_c$	ρ_c	ρ_c	$\rho_o - \rho_o$
		°	°	°	"	"	"
1844·31	O. Struve	218·0	218·0	0·0	0·33	0·26	+0·07
1846·39	,,	223·8	224·2	−0·4	0·39	0·39	0·0
1851·39	,,	228·9	230·6	−1·7	0·33	0·59	−0·26
1861·26	,,	242·8	242·8	0·0	0·33	0·34	−0·01
1883·41	Engelmann	61·4	60·1	+1·3	0·22	0·36	−0·14
1891·26	Burnham	213·4	213·4	0·0	0·22	0·21	+0·01

On the assumption that the mass of the system is equal to the mass of the Sun, the "hypothetical parallax" would be

$$p = \frac{a}{P^{\frac{2}{3}}} = 0''{\cdot}044$$

According to the Draper Catalogue of Stellar Spectra the spectrum of the star is of the first type (A).

According to Burnham the magnitudes of the components are 7·2 and 7·7. The star is *Lalande* 25074, and its position for 1900 is

R.A. $13^h\ 28^m{\cdot}3$

Decl. $+35^\circ\ 25'$

On the Formulæ of Reduction to Apparent Places of Close Polar Stars. By F. Folie.

(*Communicated by A. M. W. Downing.*)

In the *Bulletin Astronomique* (February 1888 and seq.) I made some criticisms upon the method proposed by Fabritius for the reduction of close polar stars, and on his demonstration of it, and I exhibited the discordance between the form adopted and the formulæ used in the *Berliner Jahrbuch*, the latter being more correct.

M. Fabritius, in tom. iii. of the *Observations of Kiew*, having again contested my criticisms, and given a new demonstration of his formulæ, I have made a new inquiry on the terms of second order, by a process giving the same form as his own, but with some additional terms.

The importance of the question, and the recent investigation of Mr. Downing on the computation of apparent places for *Polaris* (*Monthly Notices*, lii. 5, p. 378), give me hope that the present lines will be read with interest by astronomers.

The investigation of the terms of the second order is threefold:—

1. Terms of the second order of the nutation.
2. Terms of the second order due to the combination of the nutation and aberration.
3. Terms of the second order of the aberration.

1. *Terms of the Second Order of the Nutation.*

The first of these investigations is the most complicated, and the method I have adopted is a new one. I here give a summary of it.

The equations:—

$$(1)\qquad \begin{aligned} \frac{d\alpha}{dt} &= (\cot\epsilon + \sin\alpha\tan\delta)\frac{d\mu}{dt} - \cos\alpha\tan\delta\frac{d\theta}{dt} \\ \frac{d\delta}{dt} &= \cos\alpha\frac{d\mu}{dt} + \sin\alpha\frac{d\theta}{dt}; \end{aligned}$$

where

$$d\mu = \sin\epsilon d\lambda,$$

and, if α, δ are the mean values of the co-ordinates for the beginning of the year, give the terms of first order:—

$$(2)\qquad \begin{aligned} \Delta_1\alpha &= (\cot\epsilon + \sin\alpha\tan\delta)\Delta\mu - \cos\alpha\tan\delta\Delta\theta \\ \Delta_1\delta &= \cos\alpha\Delta\mu + \sin\alpha\Delta\theta. \end{aligned}$$

To these terms we must add $\delta\Delta_1\alpha$, $\delta\Delta_1\delta$, because in the equation (1) are included the true co-ordinates; so that α, δ are the mean co-ordinates, and $\alpha+\Delta_1\alpha$, $\delta+\Delta_1\delta$ the true ones.